The ROC curve is shown in FIG. **3** which shows the relationship between screen positive rate and detection rate using as markers free beta hCG alone+age (curve 5), PAPPA alone+age (curve 6) and a combination of these two markers+age (curve 7). From FIG. **3** it can be seen that when the combination of markers is used the detection rate is increased considerably over that using either marker individually.

Table 3 shows the actual detection rates at various screen positive rates for different combinations of serum markers.

TABLE 3

MARKERS USED	SCREEN POSITIVE RATE	DETECTION RATE
Maternal Age	5.0%	29.8%
Free B hCG + Maternal Age	5.0%	49.6%
PAPPA + Maternal Age	5.0%	45.8%
Free B hCG + PAPPA + Maternal Age	5.0%	77.3%

The results in Table 3 show that where free B hCG and PAPPA are combined as serum markers there are significant improvements in detection rates.

I claim:

1. A method for antenatal screening for a chromosomal abnormality in a fetus, comprising:

A) calculating a pregnant patient's a priori risk of carrying a fetus having said chromosomal abnormality,

B) measuring said pregnant patient's blood in the first trimester for a concentration of free beta hCG, its precursors and metabolites, or a mixture thereof,

C) measuring said pregnant patient's blood in the first trimester for a concentration of pregnancy associated plasma protein A, its precursors and metabolites, or a mixture thereof,

D) calculating a normalized value for each of said concentrations from steps B) and C) by dividing said concentrations by a median value found in a population of women with unaffected pregnancies and same gestational age as said pregnant patient,

E) calculating a first probability that the normalized values are part of a bivariate Gaussian distribution of values found in pregnancies with said chromosomal abnormality,

F) calculating a second probability that the normalized values are a part of a bivariate Gaussian distribution of values found in unaffected pregnancies,

G) calculating a likelihood ratio, said likelihood ratio being the ratio of said first probability and said second probability, and

H) modifying the a priori risk by the likelihood ratio.

2. The method of claim **1** wherein the chromosomal abnormality is Down's Syndrome.

3. The method of claim **1** wherein the chromosomal abnormality is selected from the group consisting of: Edward's Syndrome, Pateaus Syndrome, Turner Syndrome, Monosomy X, Kleinefelter's Syndrome, and any combination thereof.

4. An apparatus comprising, a means adapted for receiving measurements of a pregnant woman's maternal blood concentration of concentration of free beta hCG, its precursors and metabolites, or a mixture thereof, and a computer programmed to carry out the following activities:

A) determining a pregnant patient's a priori risk of carrying a fetus having a chromosomal abnormality,

B) measuring said pregnant patients blood in the first trimester for a concentration of free beta hCG, its precursors and metabolites, or a mixture thereof,

C) measuring said pregnant patient's blood in the first trimester for a concentration of pregnancy associated plasma protein A, its precursors and metabolites, or a mixture thereof,

D) calculating a normalized value for each of said concentrations from steps B) and C) by dividing said concentrations by a median value found in a population of women with unaffected pregnancies and same gestational age as said pregnant patient,

E) calculating a first probability that the normalized values are part of a bivariate Gaussian distribution of values found in pregnancies with said chromosomal abnormality,

F) calculating a second probability that the normalized values are a part of a bivariate Gaussian distribution of values found in unaffected pregnancies,

G) calculating a likelihood ratio, said likelihood ratio being the ratio of said first probability and said second probability, and

H) modifying the a priori risk by the likelihood ratio.

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